

Unit 1: Matter and Change

Density Notes

Density

- A physical property of matter
- The mass of a substance compared to the volume (space) it occupies.
- $D = M/V$ Mass is measured in grams, Volume in mL or cm^3
- Volume can be determined by measurements for an exact shape (ie. cube: $V = L \times W \times H$) or by water displacement for odd shapes.
- Typical units: g/cm^3 g/mL
- The number of grams per cubic centimeter
- The number of grams per milliliter

D of gold = $19.3 \text{ g}/\text{cm}^3$ This means that 1 cm^3 of gold weighs 19.3g

D of H_2O = $1.0 \text{ g}/\text{cm}^3$ This means that 1 cm^3 of water weighs 1.0g

***** 1 cm³ = 1 mL

They are interchangeable

Key Points:

- Density is not how heavy something is...(that's mass).
- Density is not how much space something takes up...(that's volume).
- Density is the mass to volume ratio for that substance.
- Every pure substance/material has its very own density that does not change, matter how much substance you have!!!
- Particles closer = more dense
- Particles more spread out = less dense

Why does a small rock sink and a large tree float in water?

Objects that float have densities that are_____

Objects that sink have densities that are_____

Example: When a 100.0 gram sample of iron is dropped into a cylinder of water, the volume increases from 10.0 mL to 25.8 mL. What is its density? Is this pure iron? (hint: the density of iron is 7.86 g/mL)